

3/9/16

Site Visit to Leavenworth National Fish Hatchery, USFWS

Leavenworth WA

Arrived around 12:30pm. Went to conference room to talk with Dave Irving, Complex Manager; Steve Croci, Deputy Complex Manager; Dave Cheney, LNFH Manager; and Malenna Cappellini, Permitting Coordinator.

Reviewed a map of complex showing water intake, water flow, and outfalls. Discussed questions related to permit application, permit coverage status, DMRs, effluent characterization, specifics on temperature and phosphorus, other WQS/permit requirements, request for additional raw data, potential for recirculating tanks pilot project, etc.

The surface water intake on Icicle Creek brings in 32 cfs of water. It is piped from the intake to a sand settling basin for initial filtration. Then it runs through screens to the rearing units (egg trays?) and 90% is discharged at Outfall 1 (at the end of the fish ladder/underneath the bridge) – 2 raceways can be discharged there at the same time.

Outfall 2 is off the Off Line Settling Basins (2 Abatement Ponds) that are not in continuous operation year round.

Outfall 3 hasn't been used at all in the last 5 years or so. It's still in the permit application for maximum flexibility/emergency use. It is at the end of the adult ponds, a few feet above Icicle Creek, where adults can be released back out into the Creek.

Outfall 4 – used for releasing fish downstream of the bridge/dam – juvenile release from the Hatchery. Used one time a year, between mid-late April for a week or so. Might also be needed for flexibility/emergency so it's in the permit application. Hatchery measures turbidity of this effluent at Outfall 4.

Outfall 5 is up closer to Headgate/Dam Structure #2 upstream – it works to keep flow in the Hatchery channel (it is not usually in use)

Outfall 6 is up the spillway dam (cement slide) over the groundwater extraction wells. Outfall 6 pumps water back into the Hatchery Channel by putting effluent (non cleaning/non abatement pond) back over the wells. Started that in Summer 2015 due to drought/low water conditions/warm water and need to pull more gw for influent cooling.

Have pictures to add to this report....

Discussed temperature and phosphorus limits and concerns, possibilities for meeting limits. Discussed process for issuing NPDES permit and receiving 401 certification from WA Department of Ecology

3/10/16 Eastbank Hatchery, Chelan County Public Utility Department/Douglas County PUD

Wenatchee, WA

Built in 1989-90. Mitigation for running dam (Rock Island Project?) on Columbia River for power generation. Rear steelhead, cutthroat trout, summer chinook

County owns and runs dams, runs PUD. WDFW is the NPDES permit holder for hatchery. Ecology writes permit for WDFW.

Piloted recirculating tank technology in 2007-2008 – been running amazingly well for last 8-9 years. Did some electrical upgrades, built some buildings, but bare bones operation working so well at 700K, working now on full scale recirc operation that will run 6.5-7M to install

It took staff about 2 years to learn to run the new system (had been using raceway technology forever) but it's clear that the recirculating tanks rear the best fish. Running 90% of fish released through raceways and about 10% through recirc at the moment. About 1M fish total and 150K summer chinook from the recirc tanks

Pre-aerate the groundwater that is pumped up from deep aquifers. 200 feet deep. Direct connection with Columbia River. 2 month lag in temp curve on groundwater, behind the River's temp curve. Groundwater piped to inside Aeration Tank. Picture 1, 2

Tank provides hydraulic head, with a mixing chamber and aerating tower. It's 80% full of re-use water, always 20% fresh groundwater coming in to system at any given time. Pumping in oxygen – by oxygenating, the water releases other gases, CO₂ and Nitrogen – cleans it up. Picture...

Next is Microscreen Drum Filter to siphon off sediment and pump it to abatement pond. Also sump pumps pull out sediment too and send right to Columbia River (part that that 20% loss from the system) sediment falls out to the bottom, pushed back to the River Pictures 3, 4

The recirc system is quick at removing waste/excess food/poop – running everything in a circular motion. Goes out to waste holding abatement pond, so Total P doesn't have time to dissolve and go into solution – helps with bringing Phosphorus down. Eastbank Hatchery has a WLA in Wenatchee River TMDL? Maybe another TMDL?? And plans to use expanded recirculation system to help meet WLA. Also waste stream kept separate/not discharged from abatement. Held, cleaned once every decade, clean water decanted off top and overflows to Columbia

Picture 5 – oxygenator technology up close. Nitrogen removal happens here. Also helps keep DO up for fish. Picture 6, monitoring of DO and temperature in the tank – pH as well

Looked at meters for flow: 307 gpm coming to system, 942 gpm recirculating at the time.

Toured about 200 people through this pilot project.

Picture 7: close-up of microdrum filter – tray blows off sediment, which is piped to the abatement ponds. Hatchery staff wash the screens regularly, once a year shutdown and take it all apart, clean with toilet bowl cleaner, and put it back together

There's additional electricity needed to run all the pumps and parts. But the water conservation aspects are really beneficial. Plus fish do better, and pollution is down. With plan for full scale system, Eastbank is thinking can take one of the groundwater wells offline, and will save a lot on electricity at that point.

Picture 8, 9,10 – Tanks. Clean water. Fish evenly distributed – there's density criteria for Hatcheries. In raceways, all crowded up front of system, dirty water further down the raceway and the fish know it. This water so clean, so well distributed, less dense, healthy, fit, etc. Swim faster, exercise more, don't get as big.... Smaller are better, more natural, able to survive once acclimated much better. They outmigrate very quickly, system rears fantastic fish, less chance for predation on the way out, lots of variable to predict return, but return has been good

Meters in Recirc Tank building measuring DO. Comes in from other room around 10+ - fish like around 8. Can always check it.

17% of the 20% lost water in small tank at end of large green tank (Picture) drains out to Columbia, Coreolis Effect – in the drain at the bottom of green tank ... to abatement ponds and River. Solids settle out, drop to bottom, collected in "fish toilets" and sent to abatement ponds Pictures 11-12-13 Solids gravity fed from green tanks to fish toilets. Abatement pond cleaned once a decade. Decanted every few days of clean water off the top that goes to the River

Thinking about using less feed to reduce Total P, reduce fish size, reduce fish poop. Chillers on water, plus re-use system will help slow growth to natural size... circulation plus cooling.

Covered recirc tanks to help with algae problem, needed to block sunlight. Broadcast feed fish by hand. Have a fish advisory committee with Tribes, NOAA, WDFW, others – meet needs of sport fishermen, mitigation for dam construction

Picture 13 – abatement pond. Raceways vacuumed daily – dropped in pond/piped from raceways and recirc tanks

Picture 14 – Outfall at Columbia River 48 cfs released between raceways and recirc tanks. Take a few years to build full scale recirc system

NOAA concerned about Formalin. Low volume on egg trays – not usually detected in effluent. Use it more in River itself when releasing juveniles/acclimating. Reared in clean, oxygenated groundwater. No real immune system. Shocked once released, need formalin for disease control upon release